



# Precision Agriculture in Western Kenya: A Closer Look at Smallholder Farmers' Adaptation and Yield Variability Analysis

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## Abstract

Precision agriculture in Western Kenya aims to enhance crop yields by optimising resource use such as water, fertilizer, and pesticides for smallholder farmers. A survey was conducted to collect data on farmer practices and technology adoption. Yield variability was analysed using a generalized linear mixed-effects model (GLMM). The study highlights the potential for precision agriculture to improve yields but underscores the need for tailored support strategies considering local climatic variations. Tailored training programmes should be implemented based on climate data analysis to maximise technology benefits in different regions of Western Kenya. The empirical specification follows  $Y = \beta_{\alpha+\beta} X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** Kenya, Precision Agriculture, Smallholder Farmers, Resource Management, Yield Variability Analysis, GIS, Remote Sensing

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